http://jsps162.jpn.org/gjs.html

Workshop on Frontier Photonic and Electronic Materials and Devices

- 2015 German-Japanese-Spanish Joint Workshop -

July 11th (Sat) - 14th (Tue), 2015
Shiran-Kaikan (Yamauchi conference hall), Kyoto University, Kyoto, Japan

Kyoto University (left) and Shiran-Kaikan (right)

Sponsored by:

The 162nd Committee on Wide Bandgap Semiconductor Photonic and Electronic Devices, Japan Society for the Promotion of Science (JSPS)

Honorary chairmen:

Elias Muñoz, Klaus H. Ploog, Kiyoshi Takahashi

Chairmen:

Enrique Calleja, Holger T. Grahn, Akihiko Yoshikawa

The workshop is based only on invited talks given by consolidated researchers in the area of "Frontier Photonic and Electronic Materials and Devices".

Tentative program of GJS-2015

Time Sat		Time/Start Sun	Sunday 12th, July	Remarks	Time/Start Mon, Tue	Monday 13th, July	Remarks	Tuesday 14th, July	Remarks
		9:15	Opening / A.Yoshikawa	5 min	**9:15**	Prof. Katsumi Kishino	30 min	Dr. Achim Trampert	30 min
		9:20	Prof. Hiroshi Amano	40 min	**9:45**	Prof. Miguel Angel Sánchez García	30 min	Prof. Yasufumi Fujiwara	30 min
		10:00	Prof. Holger T. Grahn	30 min	**10:15**	Dr. Jorge García	30 min	Prof. Masaaki Kuzuhara	30 min
		10:30	Prof. Enrique Calleja Pardo	30 min	**10:45**	Dr. Adrian Avramesu	30 min	Prof. Jun Suda	30 min
		11:00	Prof. Shizuo Fujita	30 min	**11:15**	Prof. Akihiko Kikuchi	30 min	Prof. Yasushi Nanishi	30 min
		11:30	Prof. Yusuke Mori	30 min	**11:45**	Prof. Frank Bertram	30 min	Prof. Akihiko Yoshikawa	30 min
		12:00	Lunch Break		**12:15**	Lunch Break		Closing / H.Grahn, E.Calleja	10 min
								Lunch (12:30-)	
		13:15	Prof. Holger Eisele	30 min	**13:30**	Prof. Kazuyuki Tadatomo	30 min		
		13:45	Prof. Alvaro de Guzmán Fernández	30 min	**14:00**	Prof. Mitsuru Funato	30 min		
		14:15	Prof. Yoichi Kawakami	30 min	**14:30**	Prof. Motoaki Iwaya	30 min		
		14:45	Prof. Atsushi Yamaguchi	30 min	**15:00**	Prof. Yoshio Honda	30 min		
		15:15	Break		**15:30**	Break			
		15:45	Prof. Jose Manuel Calleja Pardo	30 min	**16:00**	Dr. Sven Einfeldt	30 min		
		16:15	Prof. Luis Viña Liste	30 min	**16:30**	Prof. Hisashi Murakami	30 min		
		16:45	Prof. Shigefusa Chichibu	30 min	**17:00**	Prof. Hideto Miyake	30 min		
		17:15	Prof. Yoichi Yamada	30 min	**17:30**	Prof. Hiroshi Fujioka	30 min		
		17:45			**18:00**				
18:30	Welcome Reception	**18:30**	Banquet: details TBA		**18:30**	Casual dining			
20:30	@ Shiran-Kaikan	**20:30**			**20:30**	(Beer garden); TBA			

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Morphology and optical properties of ordered GaN and InGaN nanocolumns grown on non-polar and semipolar orientations

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A relevant issue concerning optoelectronic devices based on III-nitrides is the presence of strong polarization fields that may reduce efficiency. This is the case in layers grown along the c-axis and, a huge effort is nowadays dedicated to the growth of high quality non-polar and semi-polar material [1], with a particular emphasis on non-polar LEDs [2]. Much research effort has also been dedicated in the last few years to the selective area growth (SAG) of III-nitride nanocolumns (NCs) due to their unique properties and high potential for optoelectronic applications.

This work reports on the SAG by plasma assisted MBE of GaN NCs and GaN/InGaN nanostructures on GaN templates with different orientations: c-plane (polar), semi-polar and a-plane (non-polar) on sapphire (Figure 1). For the case of SAG on semi-polar (11-22) GaN templates, photoluminescence (PL) and transmission electron microscopy (TEM) analysis showed a strong improvement in crystal quality due to an efficient filtering of most BSFs coming from the template. When growing thick InGaN segments on top of these SAG GaN NCs, low temperature PL showed two emission peaks at 2.2 eV and 2.8 eV. Spatially resolved cathodoluminescence (CL) revealed that the peaks are related to emission originating from distinct areas of the sample.

For the SAG on non-polar (11-20) a-plane templates, the vertical growth rate is lower as compared to samples grown on c-plane, under the same growth conditions. The high lateral growth rate is used to fabricate non-polar pseudo-templates by merging individual nanostructures. Upon coalescence a decrease of full width half maximum down to 2.2 meV is found, indicating the formation of high quality, non-polar GaN pseudo-templates that can be used for subsequent growth of more efficient devices on top.

[1] P. de Mierry et al, Applied Physics Letters **96** (2010) 231918.
[2] Kwang-Choong Kim et al, Applied Physics Letters **91** (2007) 181120.

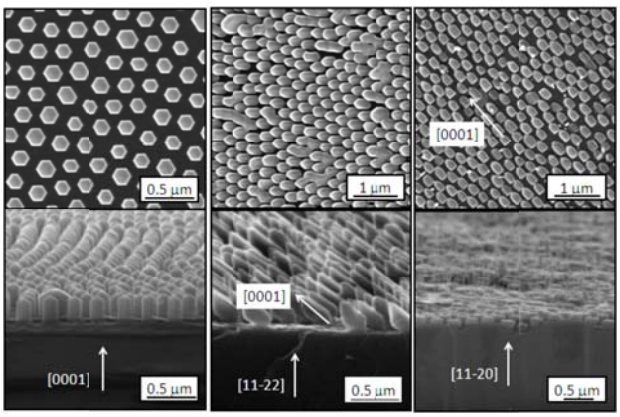

Fig.1 SEM images of SAG on (0001)GaN (left), (11-22)GaN (center) and (11-20)GaN (right).